



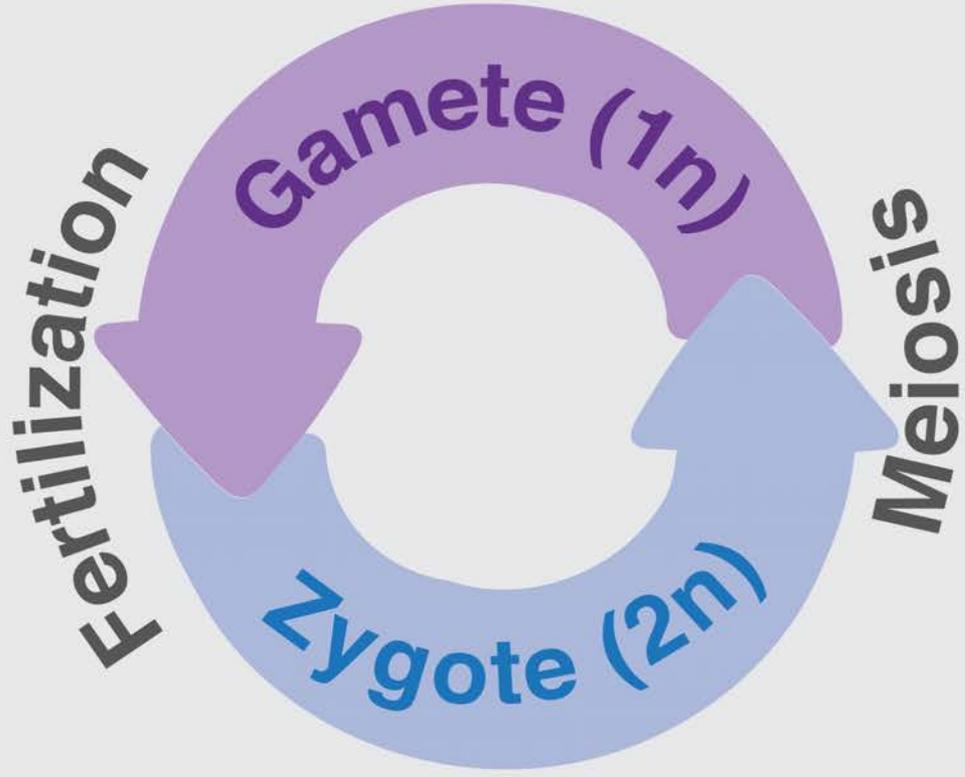
Cycling for reproductive fidelity

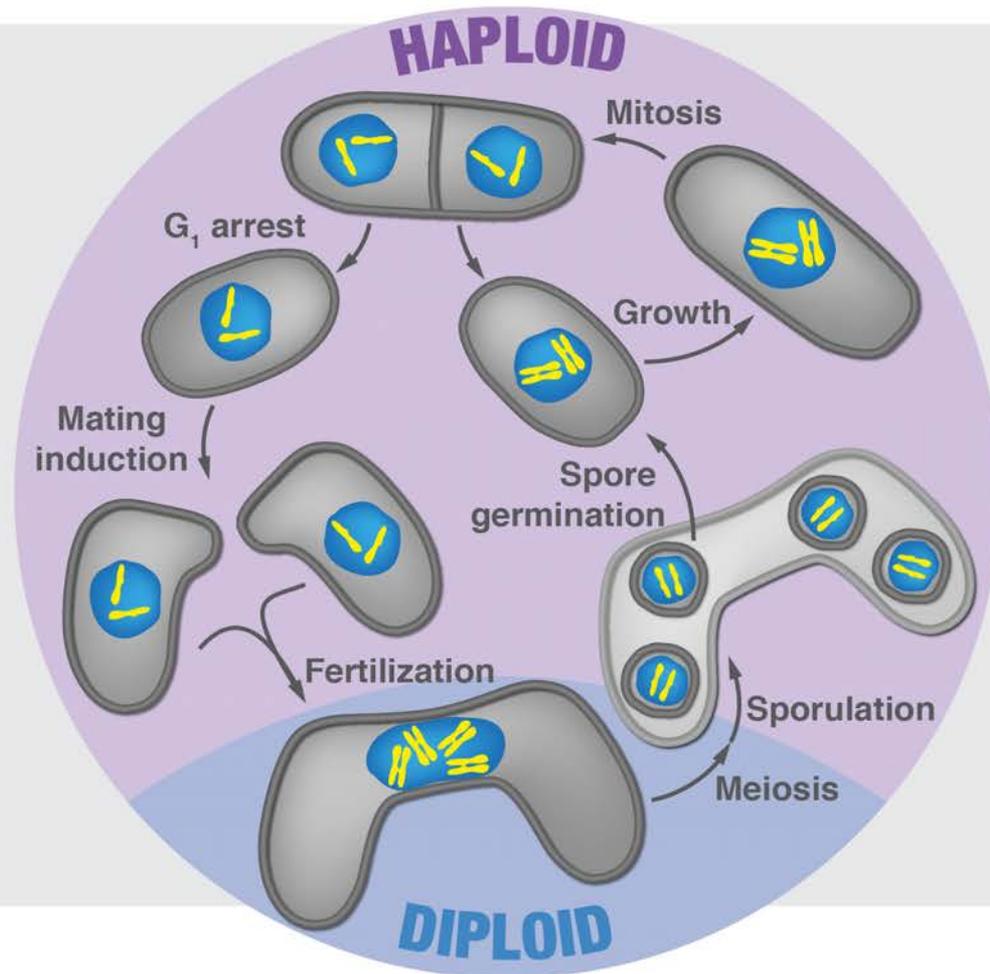
Coupling the cell cycle and re-fertilization blocks ensures ploidy maintenance during sexual lifecycle

Aleksandar Vještica, Melvin Berard, Gaowen Liu, Pedro N'kosi, Sophie G Martin

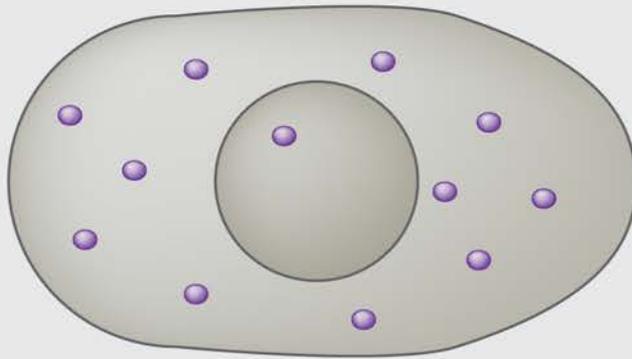
**University of Lausanne
Lausanne, Switzerland**



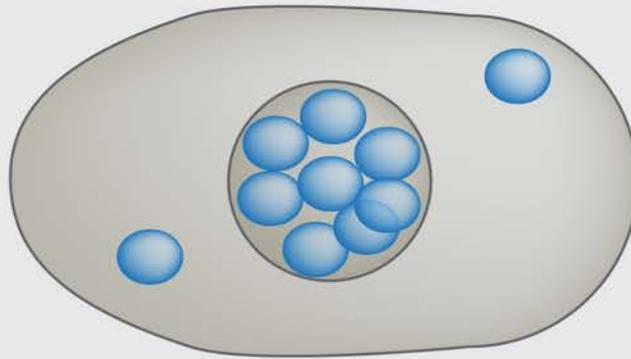




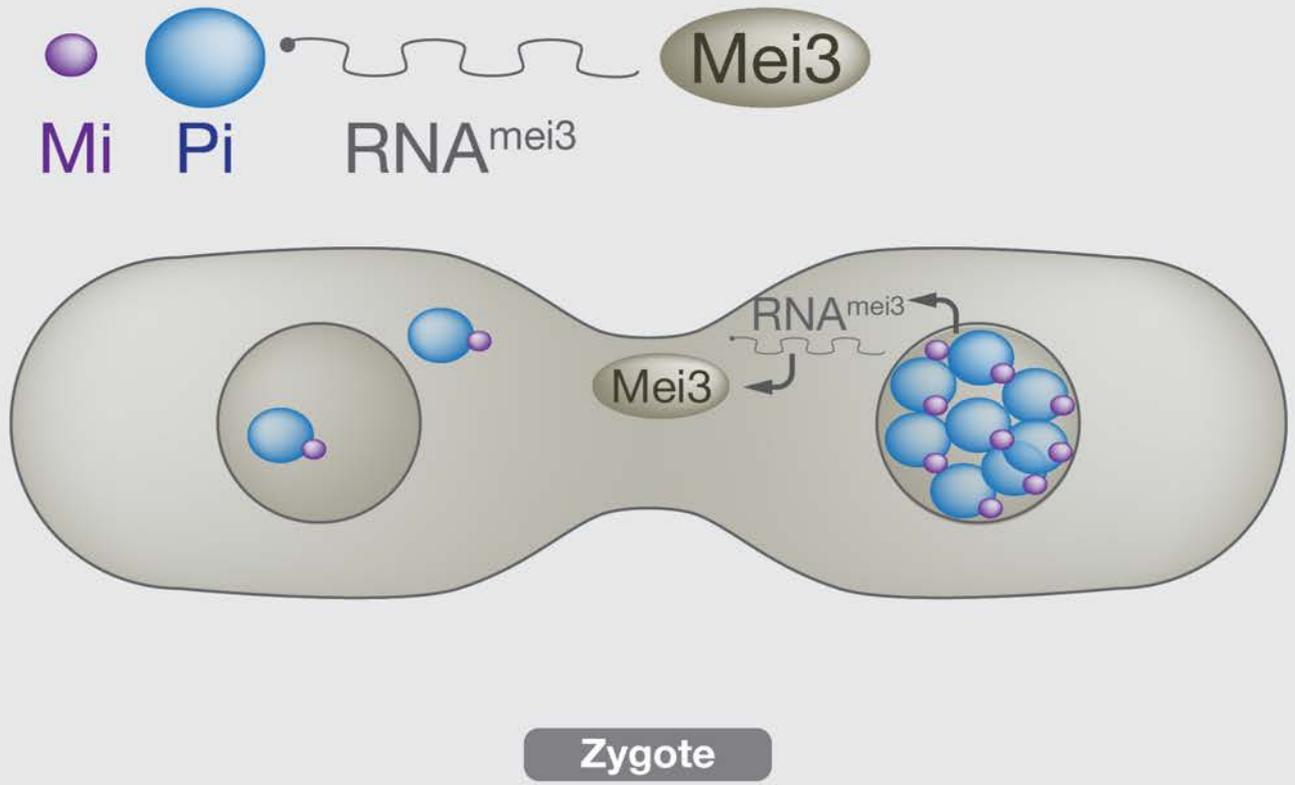
Mi Pi



M-gamete



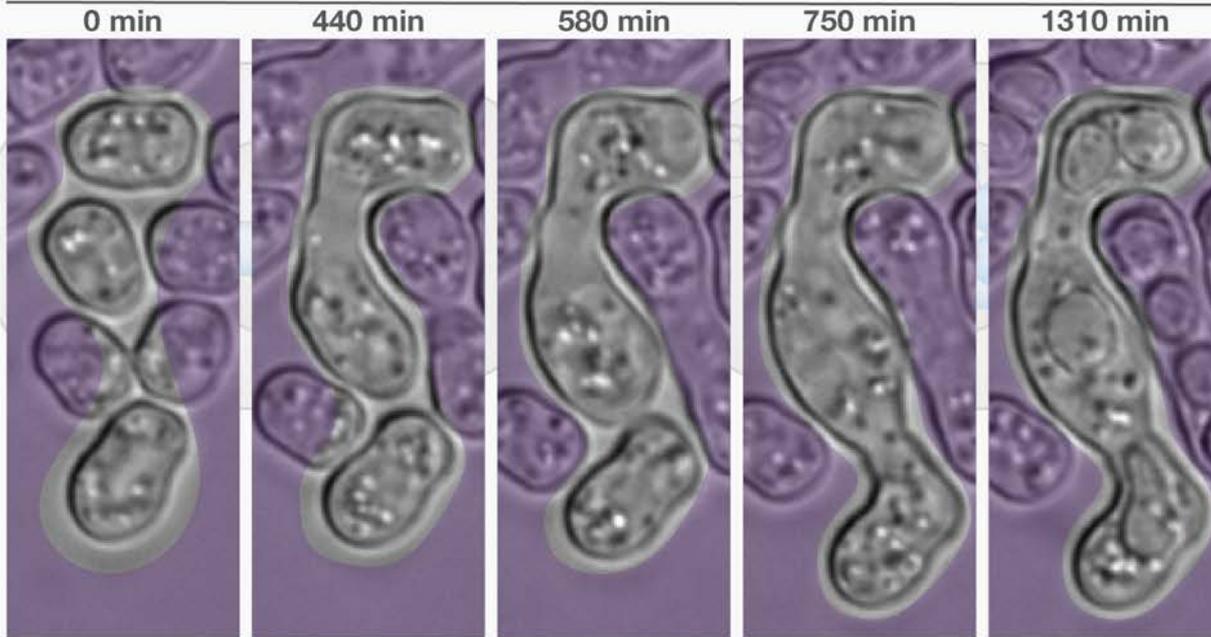
P-gamete



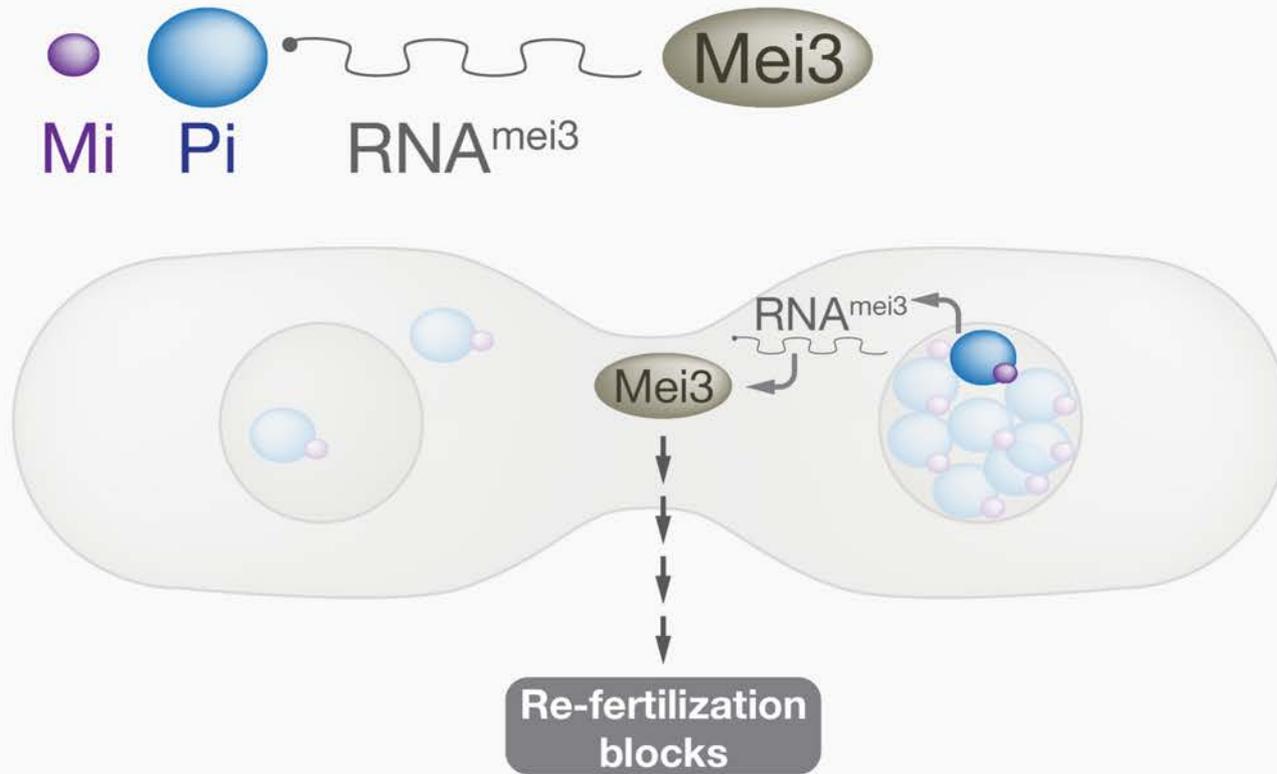
Vjestica et al., 2018. Nature



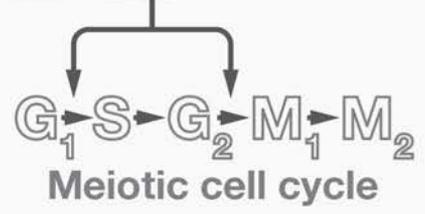
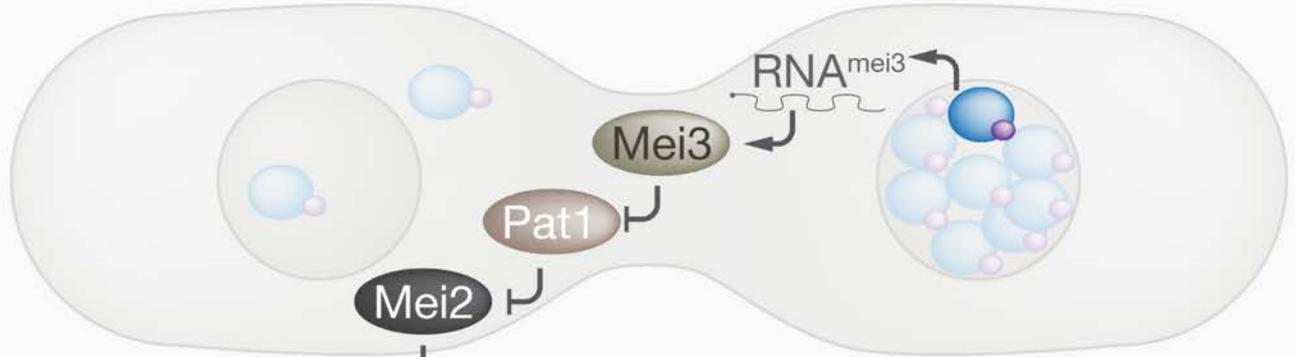
Delayed Mei3 expression



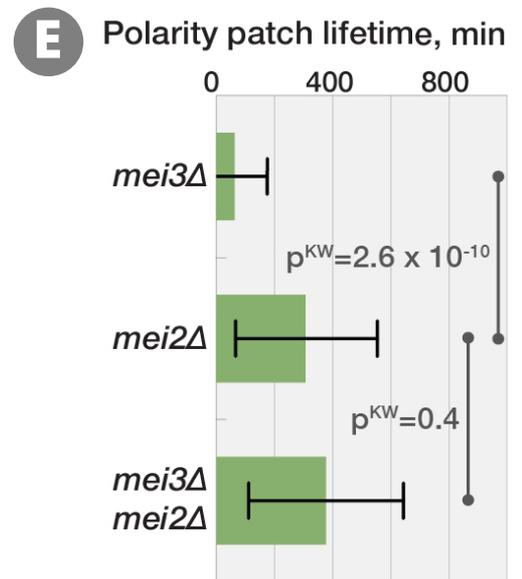
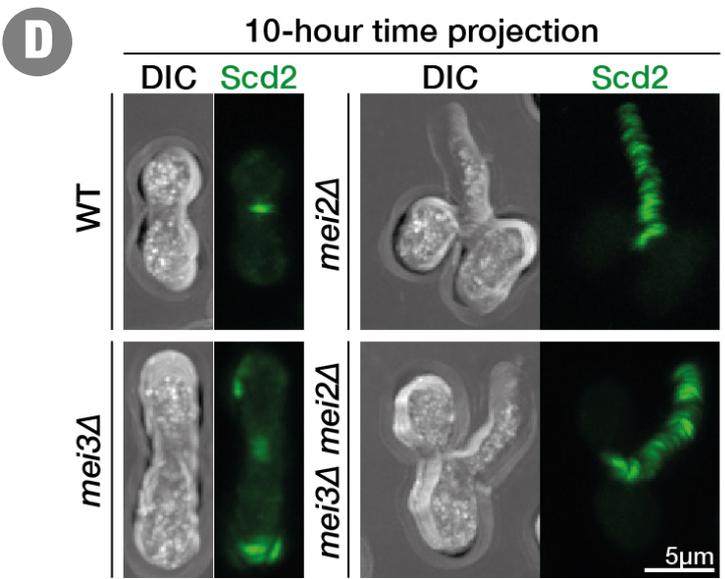
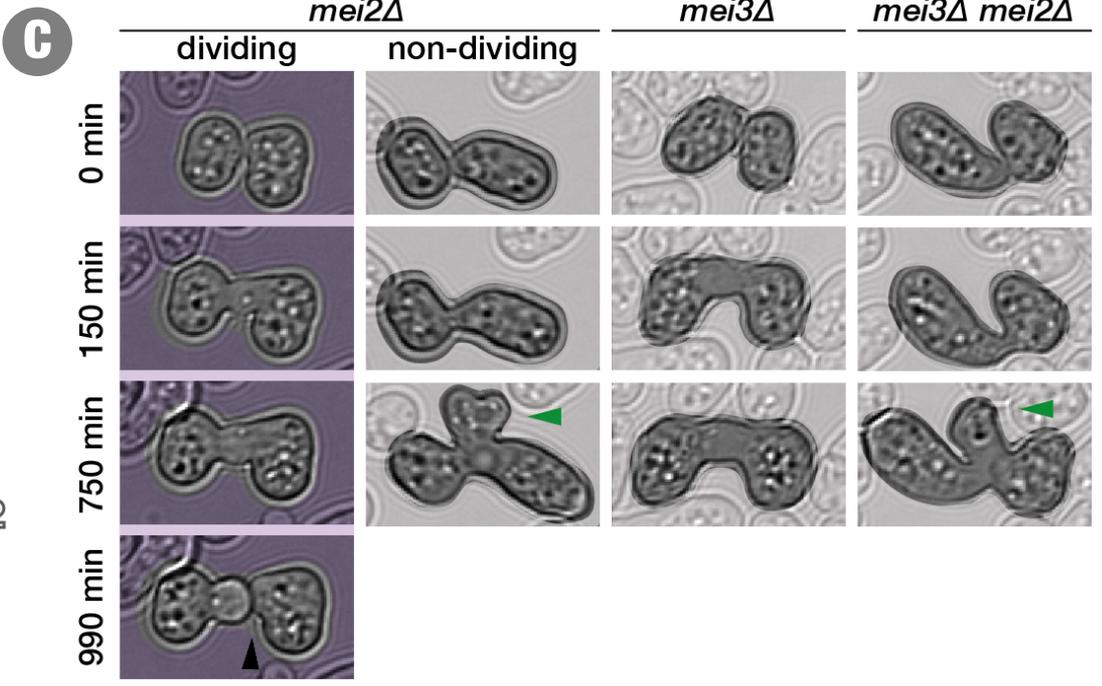
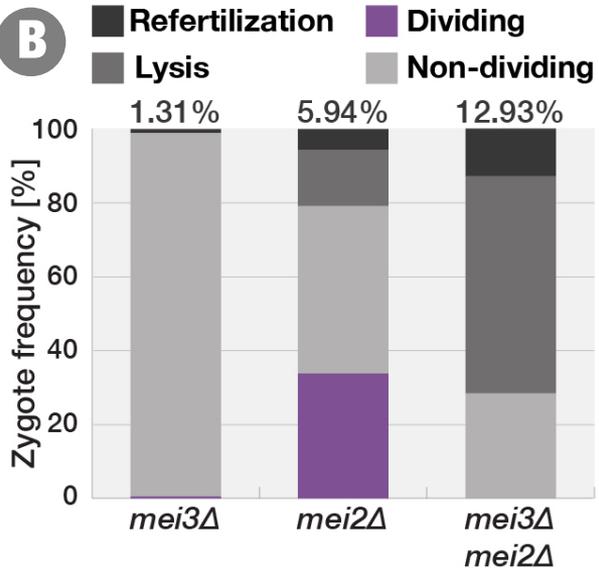
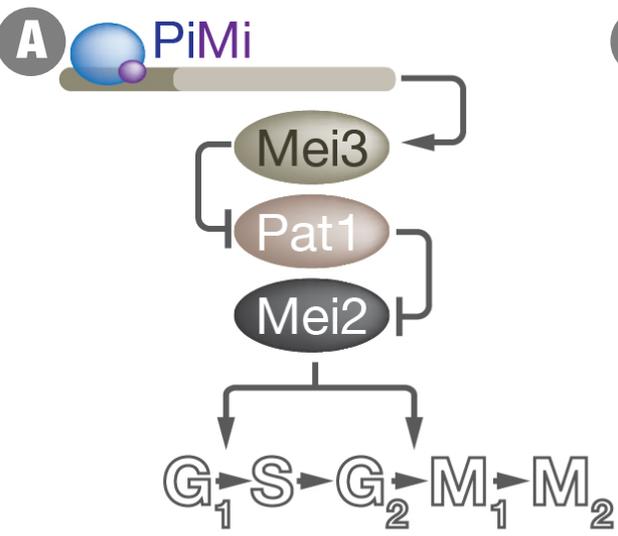
Vjestica *et al.*, 2018. *Nature*



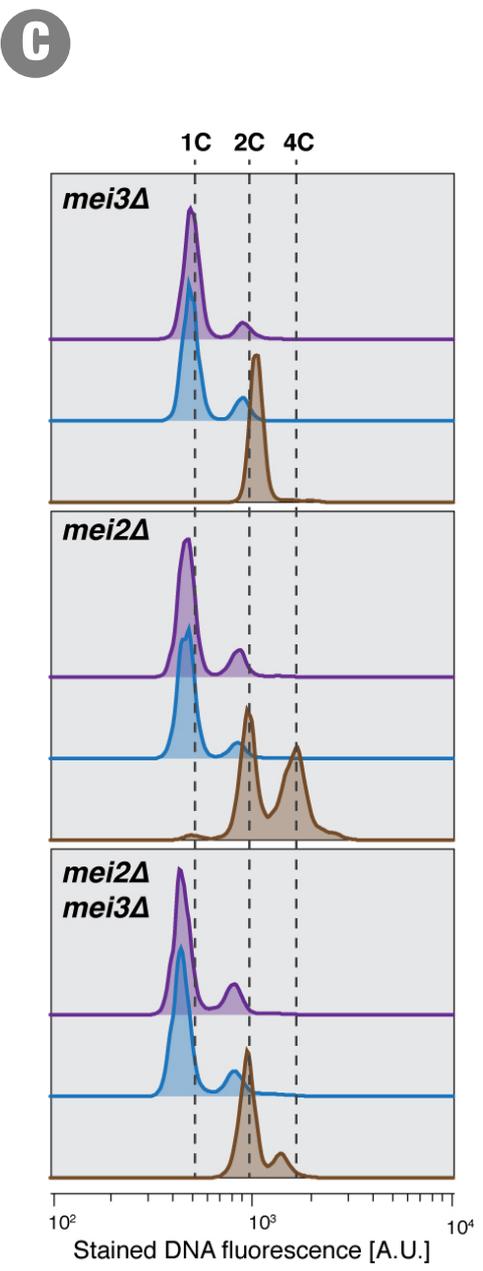
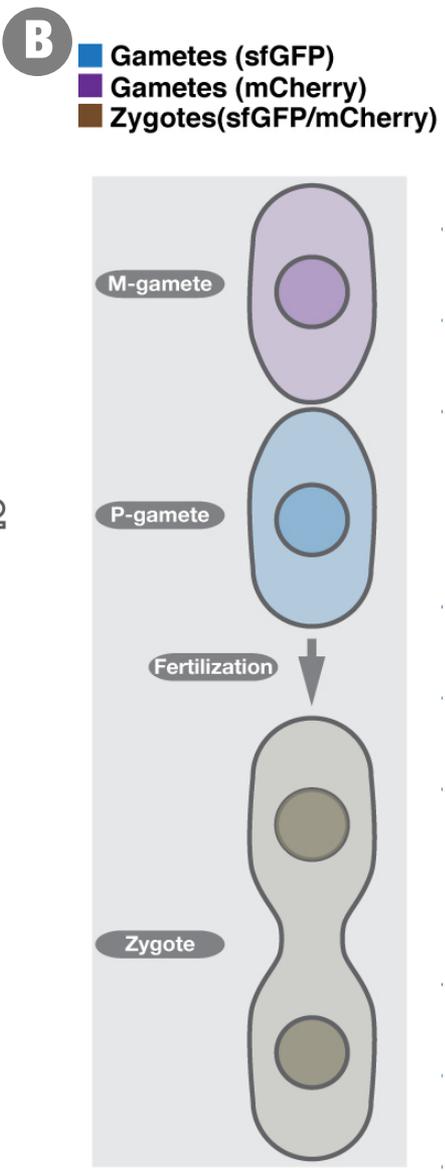
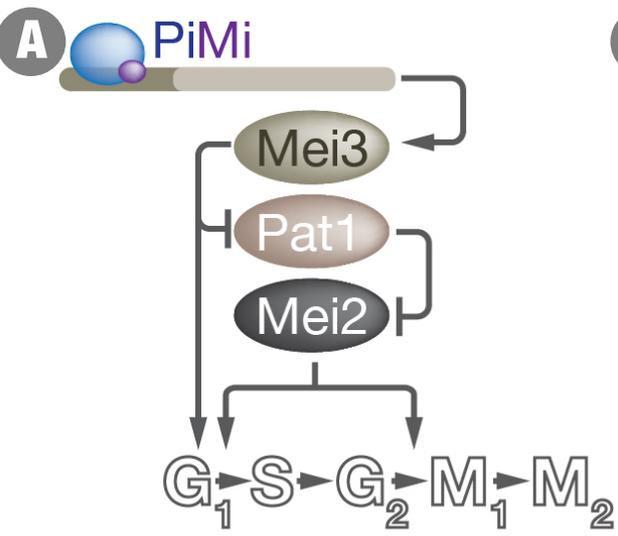
How can Mei3 block mating?



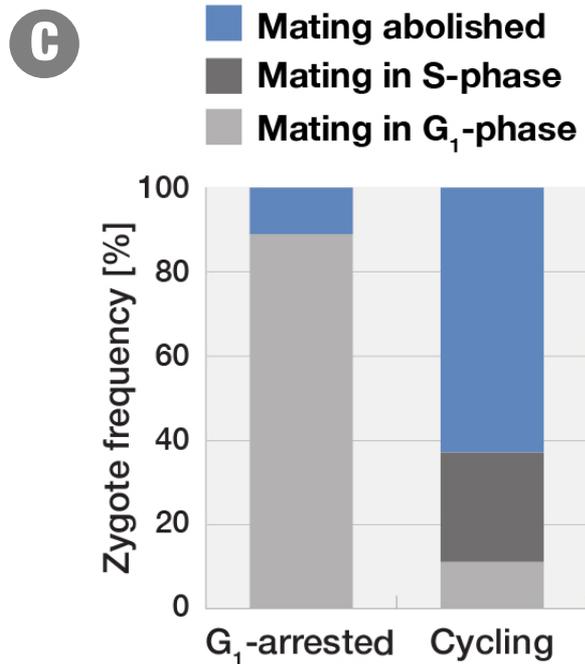
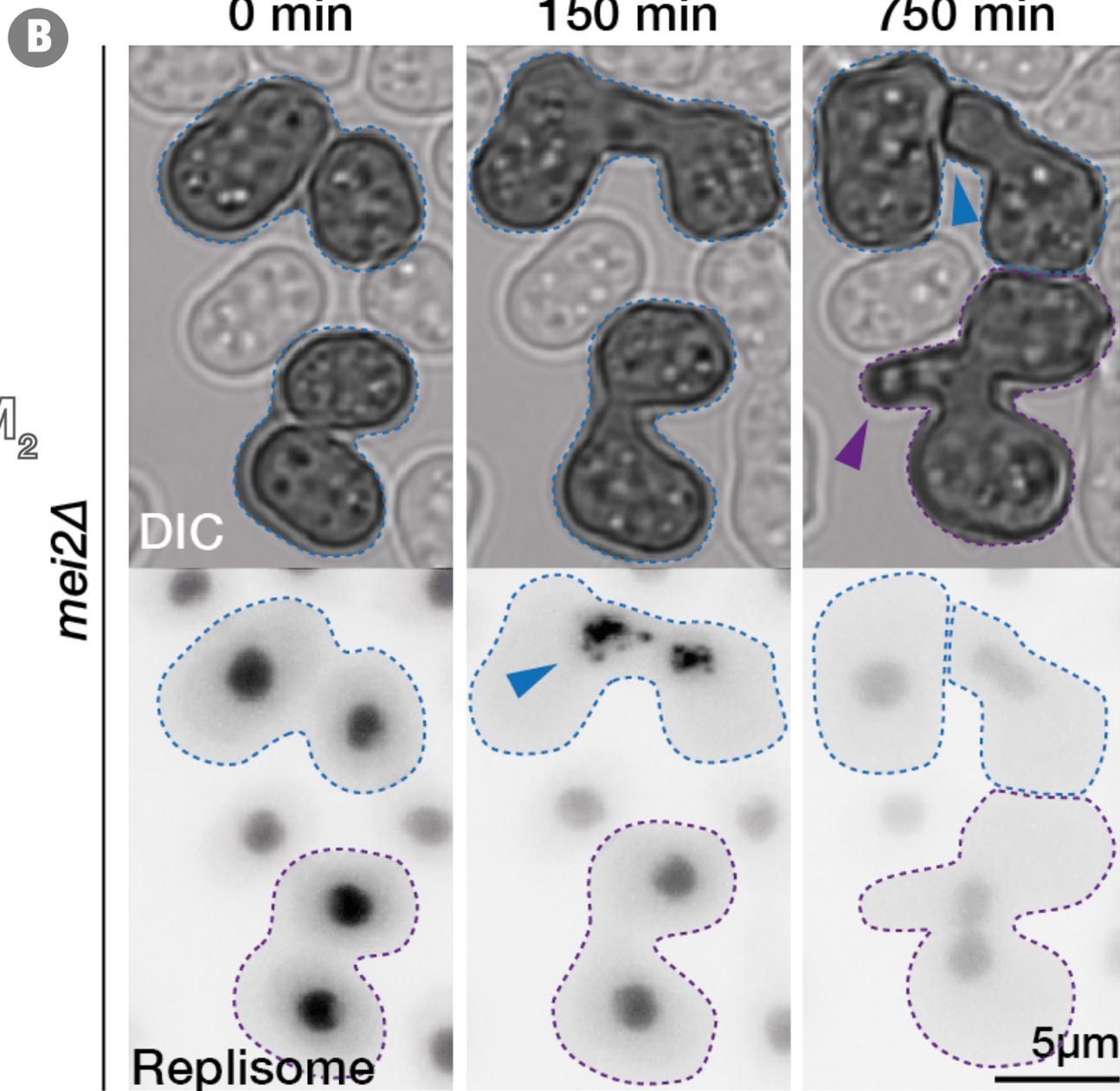
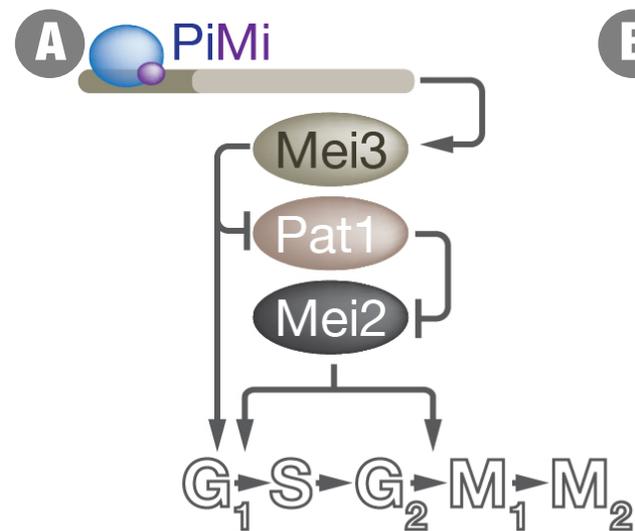
Independent branches of signaling regulate the zygotic cell cycle and growth



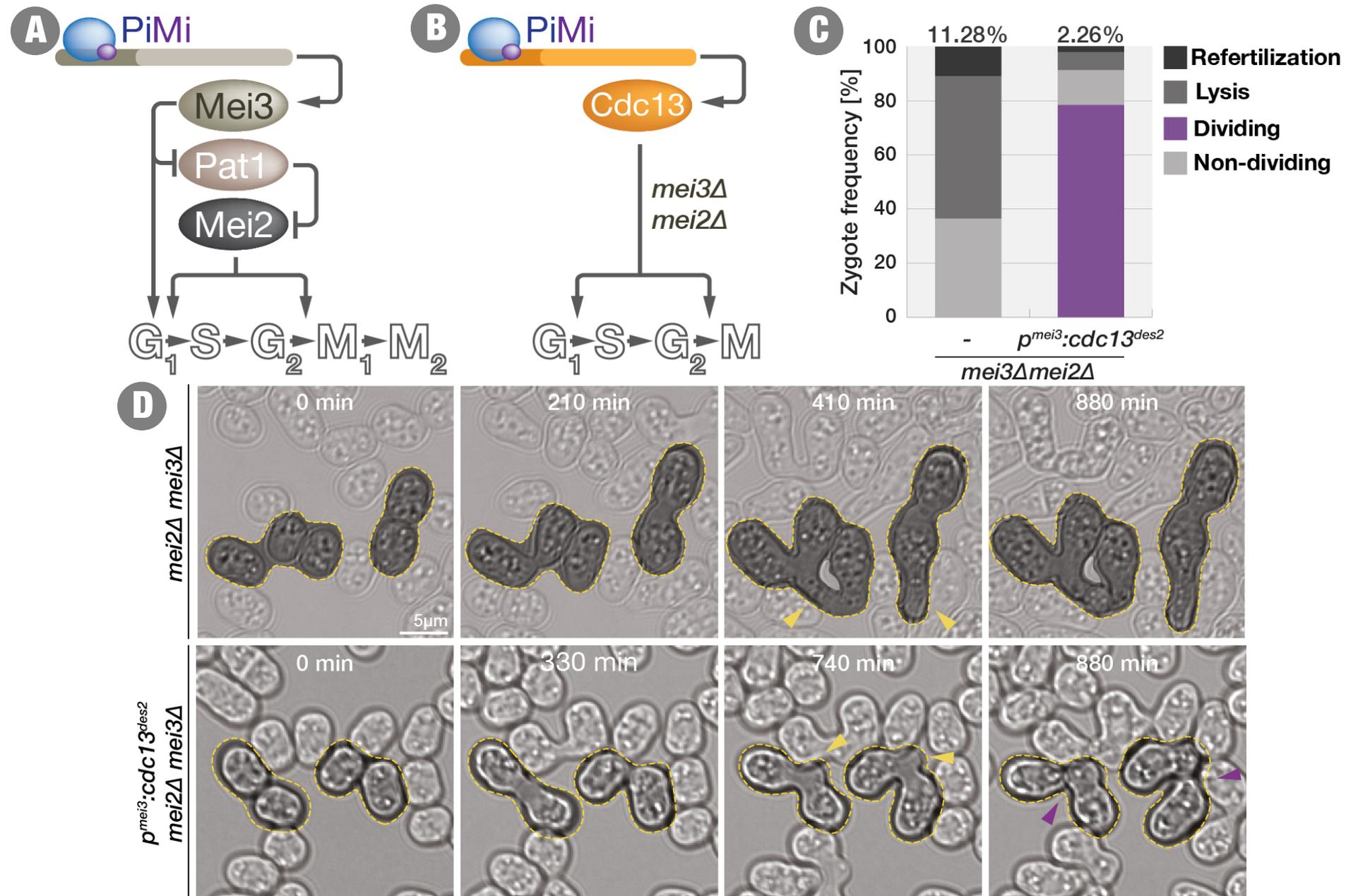
Mei3 promotes the G₁-S transition independently of the Mei2 activation



Mating occurs only in zygotes that fail to advance the cell cycle

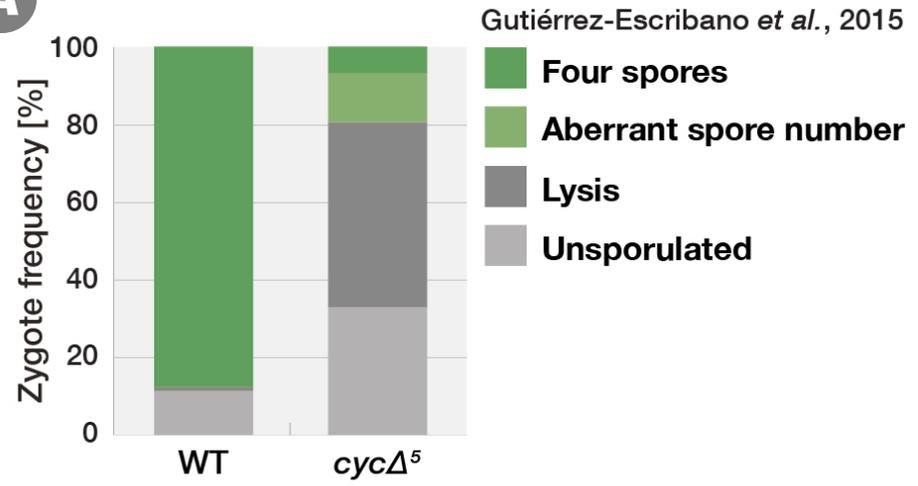


Forced cell cycle progression blocks mating

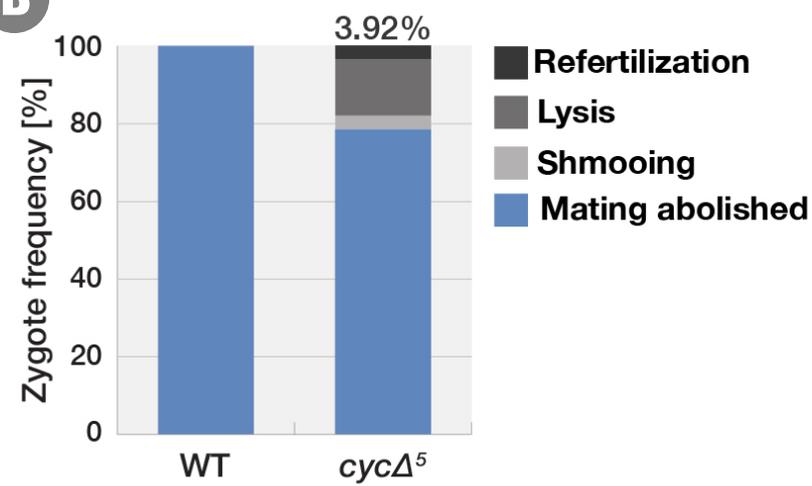


Delayed cell cycle progression leads to re-fertilization

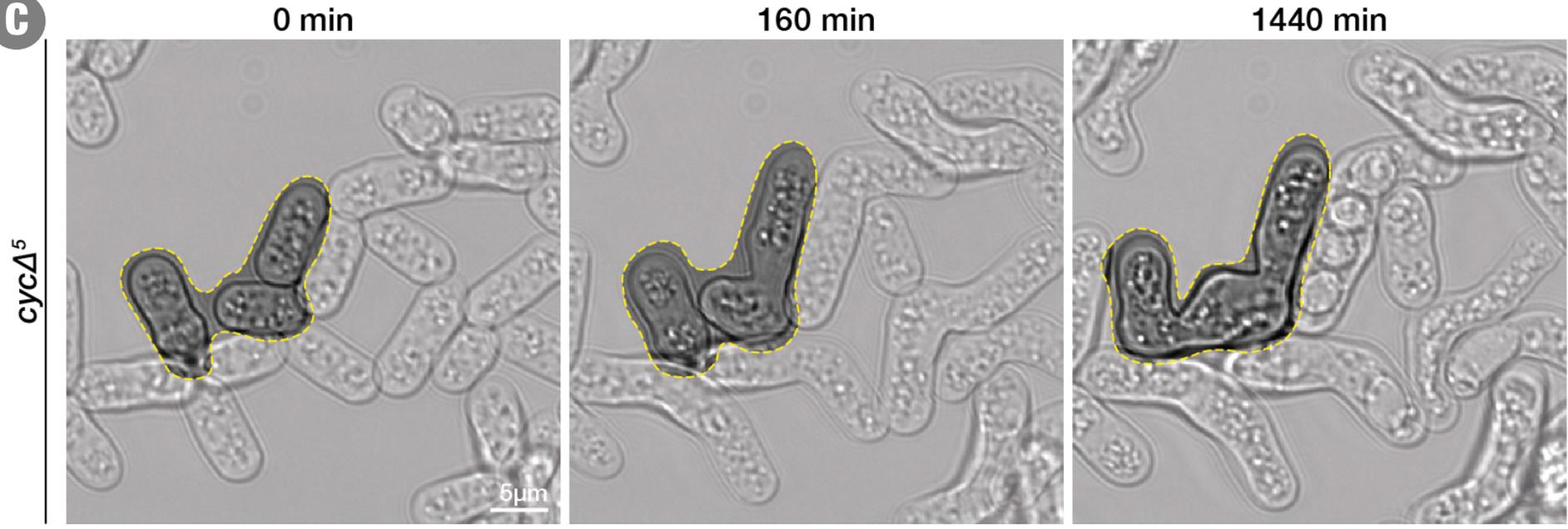
A



B

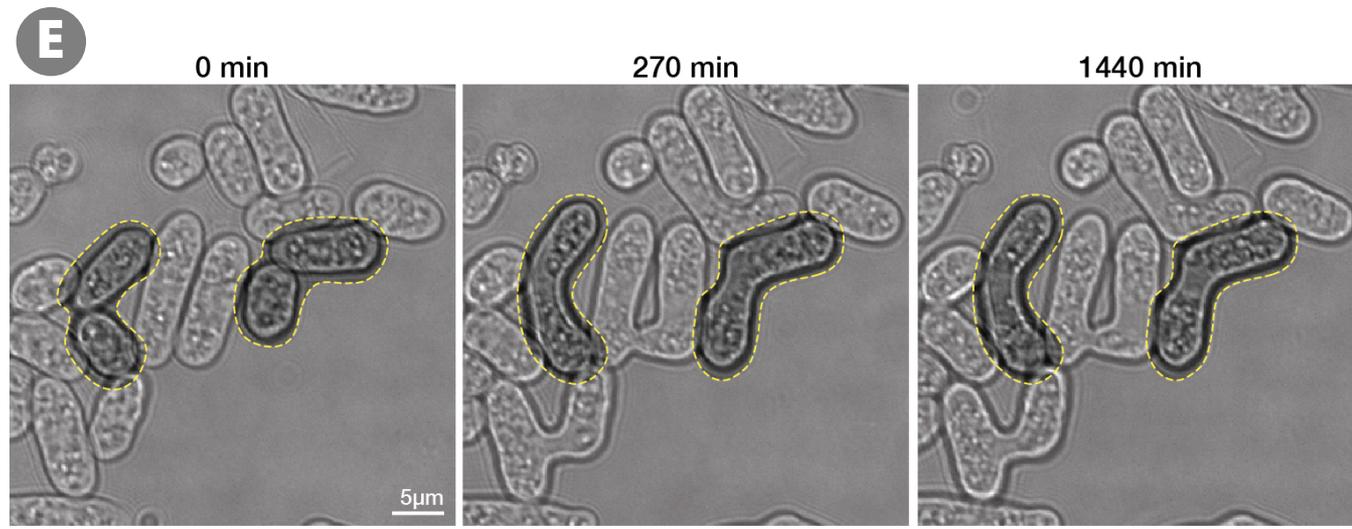
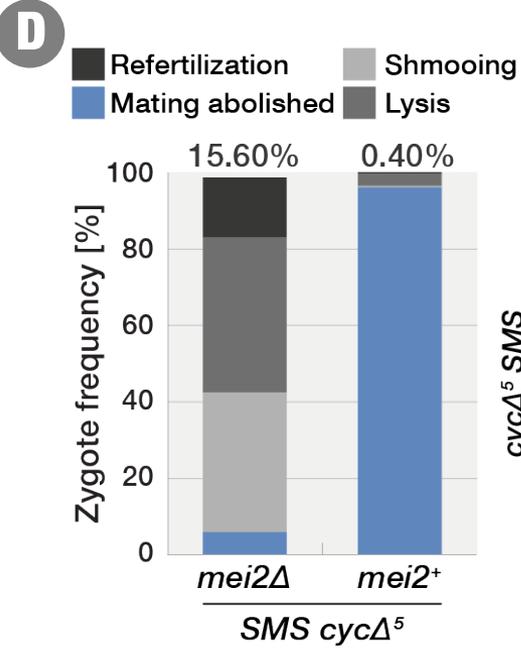
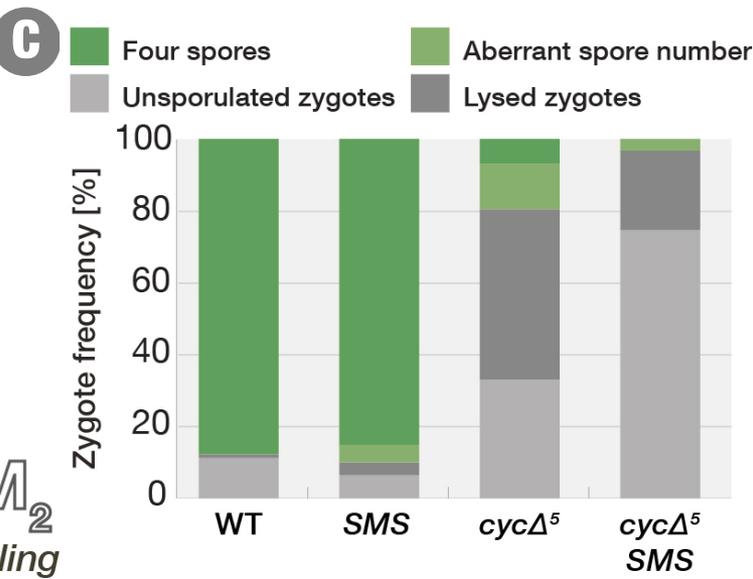
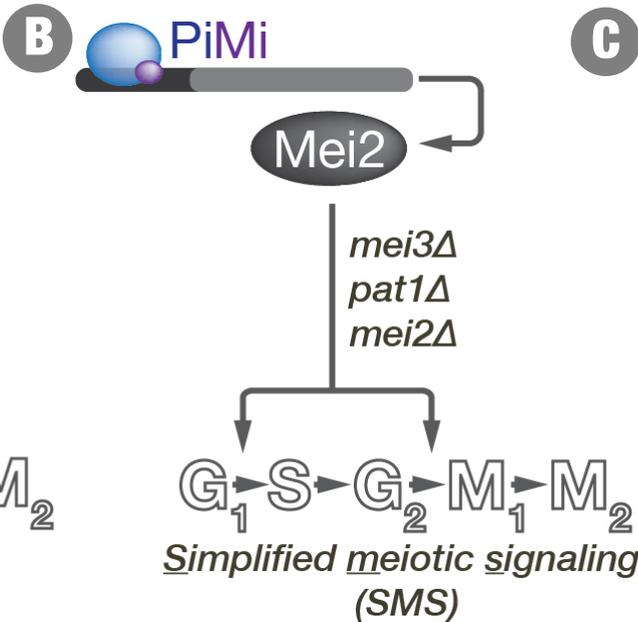
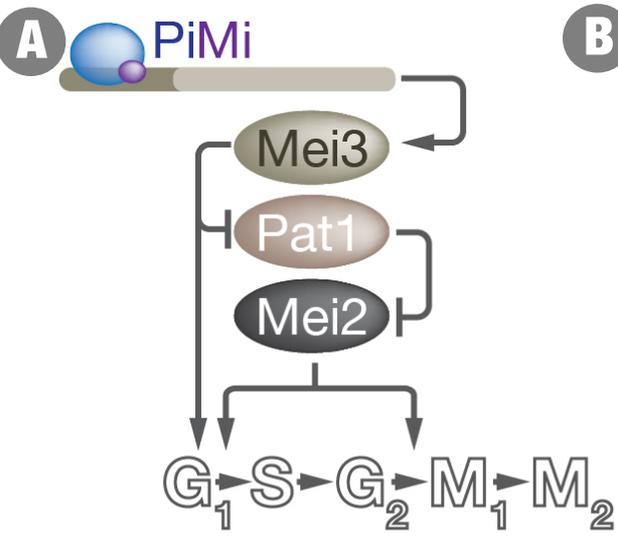


C

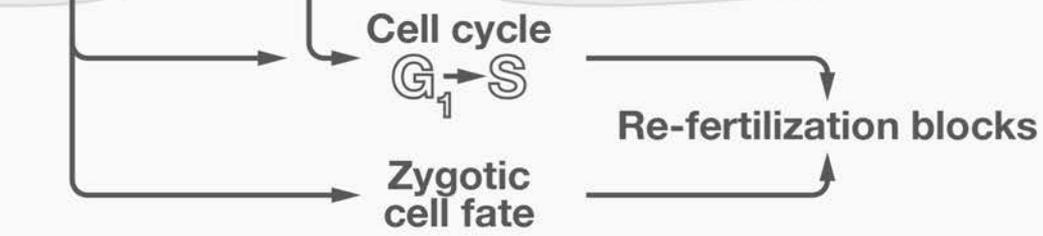
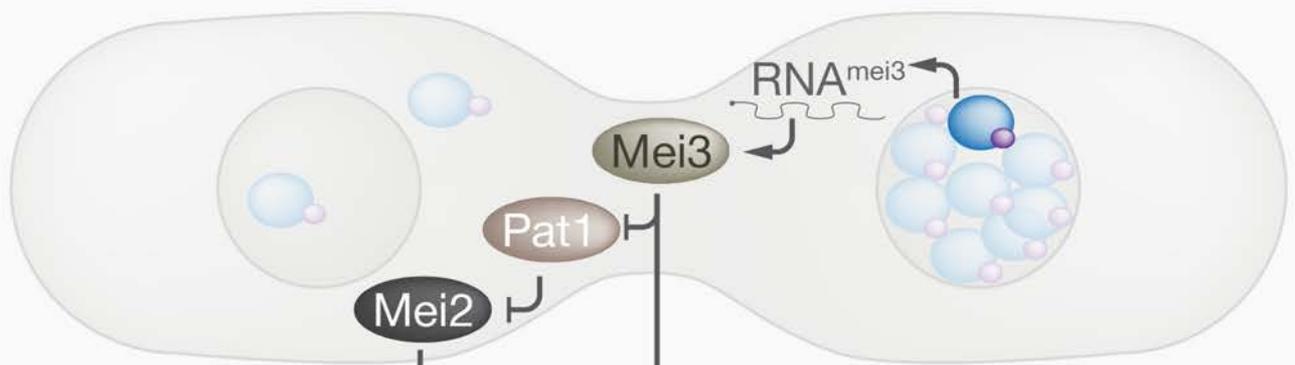


cycΔ⁵ = *cig1Δ cig2Δ crs1Δ puc1Δ rem1Δ*

Mei2 blocks mating independently of the cell cycle progression

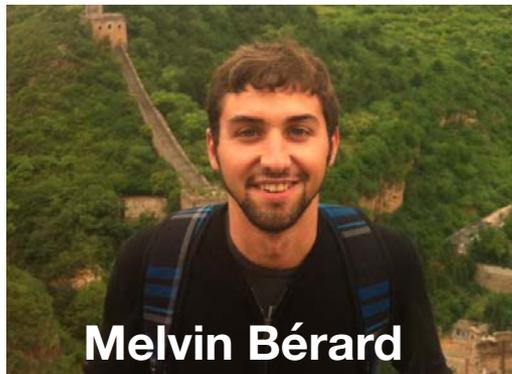


cycΔ⁵ = *cig1Δ cig2Δ crs1Δ puc1Δ rem1Δ*





Sophie Martin & Group



Melvin Bérard



Gaowen Liu

VJEŠTICA LAB

Mechanism of zygotic specification and development



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Research overview

Introduction

Sex is the key reproductive strategy in most eukaryotes. It reshuffles genes between two parental genomes to produce genetically distinct offspring, which boosts diversity of individuals in a given population. Sex is a stereotypical process that the last common ancestor of eukaryotes built around the ploidy cycle presented in Figure 1. Fusion between two haploid cells produces a diploid which then goes through meiotic divisions to reduce the ploidy. It is imperative that diploids don't mate and thus produce polyploids, and that haploids avoid meiosis which would produce aneuploids. To achieve this, eukaryotes specify distinct cell fates that restricting mating to haploid **gametes**,

